

Addendum to Data Evaluation Record

MRID: 47560121

PC Codes: 288008 288009 288010

OCSP Guideline: 850.2300 Avian Reproduction

Date: May 6, 2014

DER Study Title: Temple, D.L., *et al.* 2008. DPX-MAT28 Technical: A Reproduction Study with the Northern Bobwhite. Unpublished study performed by Wildlife International Ltd., Easton, MD. Laboratory Project No. 112-602. Study sponsored by E.I. du Pont de Nemours and Company, Wilmington, DE. Study initiated September 10, 2007 and submitted June 24, 2008.

Changes Made: Change in status, from invalid to acceptable.

Rationale: The study was originally classified invalid (A. Ullagaddi, 10/05/2009, DP Barcode 358148), because the cage size was considerably smaller than preferred by the draft OPPTS 850.2300 guideline, the initial age of the test birds was younger than recommended, pre-test health (including mortality) of the adult birds was not reported, and frozen storage stability data were not provided. Of these deviations, cage size was the original reviewer's preeminent concern. However, cage size recommendations are no longer as prescriptive in the final OCSP 850.2300 guideline published in June 2012. OCSP guideline 850.2300 states: "The Agency recognizes that minimum cage size recommendations are evolving over time. The use of a certain cage size, as with any husbandry parameter, should result in control birds with no overt signs of stress (*e.g.*, reproductive results are within test validity elements reported in this guideline). Northern bobwhite and mallards should be housed in breeding pens or cages of adequate size conforming to good husbandry practices." All established validity criteria for the controls were met. While cage size may have been directly or indirectly responsible for the mortalities and injuries recorded in this study, the frequency and severity of recorded effects do not reduce confidence that the test remained sufficiently robust to detect treatment-related effects to study endpoints.

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

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Data Requirement:	PMRA Data Code {.....}
	EPA DP Barcode 358148
	OECD Data Point {.....}
	EPA MRID 47560121
	EPA Guideline 850.2300

Test material: DPX-MAT28 Technical **Purity:** 92.2%
Common name Aminocyclopyrachlor
Chemical name:
 IUPAC: 6-amino-5-chloro-2-cyclopropylpyrimidine-4-carboxylic acid
 CAS: 6-amino-5-chloro-2-cyclopropyl-4-pyrimidinecarboxylic acid
 CAS No.: 858956-08-8
 Synonyms: None reported

Primary Reviewer: Christie E. Padova
Staff Scientist, Dynamac Corporation

Signature: *Christie E. Padova*
Date: 07/14/09

Primary Reviewer: Teri S. Myers
Senior Scientist, Cambridge Environmental Inc.

Signature: *Teri S. Myers*
Date: 07/21/09

Secondary Reviewer: Anita Ullagaddi
EPA/OPP/EFED/ERB1

Signature: *Anita Ullagaddi*
Date: 10/05/09

Reference/Submission No.: {.....}

Company Code	{.....}	[For PMRA]
Active Code	{.....}	[For PMRA]
Use Site Category	{.....}	[For PMRA]
EPA PC Code	None assigned	

Date Evaluation Completed: 10/05/09

CITATION: Temple, D.L., *et al.* 2008. DPX-MAT28 Technical: A Reproduction Study with the Northern Bobwhite. Unpublished study performed by Wildlife International Ltd., Easton, MD. Laboratory Project No. 112-602. Study sponsored by E.I. du Pont de Nemours and Company, Wilmington, DE. Study initiated September 10, 2007 and submitted June 24, 2008.

DISCLAIMER: This document provides guidance for EPA and PMRA reviewers on how to complete a data evaluation record after reviewing a scientific study concerning the reproductive effects of a pesticide on avian species. It is not intended to prescribe conditions to any external party for conducting this study nor to establish absolute criteria regarding the assessment of whether the study is scientifically sound and whether the study satisfies any applicable data requirements. Reviewers are expected to review and to determine for each study, on a case-by-case basis, whether it is scientifically sound and provides sufficient information to satisfy applicable data requirements. Studies that fail to meet any of the conditions may be accepted, if appropriate; similarly, studies that meet all of the conditions may be rejected, if appropriate. In sum, the reviewer is to take into account the totality of factors related to the test methodology and results in determining the acceptability of the study.

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EXECUTIVE SUMMARY

The one-generation reproductive toxicity of DPX-MAT28 Technical (aminocyclopyrachlor) to 16 pairs per level of 20-week old Northern bobwhite quail (*Colinus virginianus*) was assessed over *ca.* 22 weeks. DPX-MAT28 was administered to the birds in the diet at nominal concentrations of 0 (control), 160, 400, or 1000 mg ai/kg dw diet (adjusted for purity). Mean-measured concentrations were <LOD (control), 159, 382, and 994 mg ai/kg diet, respectively.

The scientific soundness of this study is questionable study due to the significantly smaller cage size used in the study than recommended in the guideline. Because seven incidental mortalities, which may be attributable to small cage size, occurred during the study, cage size may have affected the reproductive endpoints measured in this study in all treatment levels, including the controls. This study is classified as invalid. It does not satisfy the guideline requirement for a Northern bobwhite quail (*Colinus virginianus*) reproductive toxicity study.

Results Synopsis

Test Organism Size/Age (mean Weight): 20-weeks old; 179 to 234 g (combined sexes)

NOAEC: N/A

LOAEC: N/A

Endpoint(s) Affected: N/A

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I. MATERIALS AND METHODS

GUIDELINE FOLLOWED: U.S. EPA *Pesticide Assessment Guidelines*, §71-4 (1982)
OECD Guideline No. 206 (1984)
ASTM Standard E1062-86 (1986)
U.S. EPA OPPTS Guideline No. 850.2300 (1996)

Deviations from OPPTS Guideline No. 850.2300 included:

1. The initial age of the test birds (20 weeks) was younger than recommended (at least 30 weeks old).
2. Pre-test health (including mortality) of the adult birds was not reported.
3. Cage size was significantly smaller than recommended. OPPTS recommends at least 5,000 cm² per bird. In this study, the floor space was only 638 cm² per bird.
4. Although acceptable ambient 7-day feeder trough stability was demonstrated, frozen storage stability data were not provided. Premix batches were prepared every 2 to 4 weeks, and stored frozen in plastic bags until needed (see Reviewer's Comments section).

These deviations, specifically cage size, may affect the scientific soundness of this study.

COMPLIANCE: Signed and dated GLP, Quality Assurance and Data Confidentiality statements were provided. This study was conducted in compliance with the GLP Standards as published in the 40 CFR, Part 160 with the following exception: routine analysis of food and water for potential contaminants.

A. MATERIALS:

1. Test Material DPX-MAT28 Technical (aminocyclopyrachlor)

Description: Solid

Lot No./Batch No.: 009

Purity: 92.2%

Stability of compound under test conditions: The 7-day stability of DPX-MAT28 Technical (aminocyclopyrachlor) was verified at all treatment levels under actual-use conditions during Week 3. Recoveries were 97 to 112% of initial measured concentrations.

(OECD recommends water solubility, stability in water and light, pKa, Pow, and vapor pressure of test compound)

Storage conditions of test chemicals: Ambient conditions

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Physicochemical properties of Aminocyclopyrachlor.

Parameter	Values	Comments
Water solubility at 20°C	Not reported	
Vapor pressure	Not reported	
UV absorption	Not reported	
pKa	Not reported	
Kow	Not reported	

2. Test organism:

Table 1: Test organism.

Parameter	Details	Remarks
		Criteria
Species (common and scientific names):	Northern bobwhite quail (<i>Colinus virginianus</i>)	Birds were from the same hatch, and were phenotypically indistinguishable from wild birds.
		<i>Recommended species include a wild waterfowl species, preferably the mallard (Anas platyrhynchos) or an upland game species, preferably the northern bobwhite (Colinus virginianus)</i>
Age at Study Initiation:	20 weeks old	Birds were younger than recommended (≥ 30 weeks). It was stated that birds were approaching their first breeding season.
		<i>Birds approaching their first breeding season should be used.</i>
Body Weight: (mean and range)	Males: Overall range (n=64) of 179 to 233 g, with group means of 197 to 201 g.	Body weights were recorded at weeks 0, 2, 4, 6, 8, 10, and 22 (adult termination).
	Females: Overall range (n=64) of 180 to 234 g, with group means of 197 to 202 g.	<i>Body weights should be recorded at test initiation and at biweekly intervals up to week eight or up to the onset of egg laying and at termination.</i>

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Parameter	Details	Remarks
		Criteria
Source:	Buckeye Game Birds Defiance, OH	All birds should be from the same source.

B. STUDY DESIGN:

1. Experimental Conditions

a. Range-finding study: The dietary concentrations were selected in consultation with the Sponsor, based upon results from a pilot reproduction study (Wildlife International, Ltd., Project No. 112-600; not further described) and additional toxicity information provided by the Sponsor.

b. Definitive Study

Table 2: Experimental Parameters.

Parameter	Details	Remarks
		Criteria
Acclimation period:	4 weeks	All birds were examined daily during acclimation, and birds exhibiting abnormal behavior or debilitating physical injuries were excluded from the study.
Conditions (same as test or not):	Same as test	During acclimation, birds received ≤8 hours of light/day.
Feeding:	Wildlife International Ltd. Game Bird Ration formulated by Cargill Animal Nutrition (Shippensburg, PA) and tap water from the town of Easton were provided <i>ad libitum</i> .	<i>Recommended observation period includes a 2-3 week health observation period prior to selection of birds for treatment. Generally, birds should be healthy without excess mortality. Feeding should be <u>ad libitum</u>, and sickness, injuries or mortality should be noted.</i>
Health (any mortality observed):	Mortality not reported.	

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Parameter	Details	Remarks
		Criteria
<u>Test duration</u> pre-laying exposure: egg-laying exposure: withdrawal period, if used:	11 weeks 11 weeks N/A	<u>Recommended pre-laying exposure duration:</u> At least 10 weeks prior to the onset of egg-laying. <u>Recommended exposure duration with egg-laying:</u> At least 10 weeks. <u>Recommended withdrawal period:</u> If reduced reproduction is evident, a withdrawal period of up to 3 weeks should be added to the test phase.
<u>Pen (for parental and offspring) size:</u> construction materials: number:	Parents (one pair) were housed in battery cages measuring 25 x 51 x 20/26 cm high (sloping floors). Offspring (by set and group) were housed in 72 x 90 x 23 cm high battery brooders. Parental and offspring pens were constructed of galvanized wire mesh and galvanized sheeting. Sixteen adult pens (housing two adult birds) per level. Hatchlings were group-housed according to the appropriate parental concentration.	Cage size was significantly smaller than recommended. OPPTS recommends at least 5,000 cm ² per bird. In this study, the floor space was only 638 cm ² per bird. Cage sizes smaller than recommended should be shown to not adversely affect the health or reproduction of the birds. Sisal ropes were added to each adult pen for animal enrichment from the time of photostimulation to termination (Weeks 10 to 22). <u>Pens</u> Pens should have adequate room and be arranged to prevent cross-contamination. <u>Materials</u> Recommended materials include nontoxic material and nonbinding material, such as galvanized steel. <u>Number</u> At least 5 replicate pens should be used for mallards housed in groups of 7. For other arrangements, at least 12 pens should be used, but considerably more may be used if birds are kept in pairs. Chicks should be housed according to parental grouping.

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Parameter	Details	Remarks
		Criteria
Number of birds per pen (male:female)	2 birds/pen (1 male:1 female)	<p>One male and one female per pen should be used. For quail, one male and two females should be used. For ducks, two males and five females should be used.</p>
<u>Number of pens per group/treatment</u> negative control: solvent control: treated:	N/A 16 pens 16 pens/treatment	<p>At least 12-16 pens should be used, but considerably more if birds are kept in pairs.</p>
<u>Test concentrations (mg ai/kg diet)</u> nominal: measured:	0 (control), 160, 400, and 1000 mg ai/kg diet <LOD (control), 159, 382, and 994 mg ai/kg diet, respectively	<p>Nominal concentrations were adjusted for the purity of the test substance.</p> <p>Measured concentrations were determined at all levels during Weeks 2, 4, 5, 6, 10, 14, 18, and 22.</p> <p>Recommended test concentrations include at least two concentrations other than the control; three or more will provide a better statistical analysis. The highest test concentrations should show a significant effect or be at or above the actual or expected field residue level.</p>
Maximum labeled field residue anticipated and source of information:	Not specified	<p>The highest test concentrations should show a significant effect or be at or above the actual or expected field residue level. The source (i.e., maximum label rate in lb ai/A and ppm), label registration no., label date, and site should be cited]</p>

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Parameter	Details	Remarks
		Criteria
Solvent/vehicle, if used type: amount:	Corn oil 0.082% (v:w)	Reviewer-calculated: 180 mL corn oil ÷ 7938.0 g ration x 2000 g portion premix = 45.35 mL acetone, in 55,000 g final diet x 100 = 0.082% (v:w).
		<i>Recommended solvents include corn oil or other appropriate vehicle not more than 2% of diet by weight</i>
Was detailed description and nutrient analysis of the basal diet provided? (Yes/No)	Yes. The basal ration contained at least 27% protein and 2.5% fat, and no more than 3.8% fiber. The diet was supplemented with 5% (w:w) limestone to provide necessary calcium for proper eggshell formation.	Offspring were fed basal ration without the addition of test substance or limestone, and received a water-soluble vitamin and electrolyte mix in their water. Neither the adults nor offspring received any form of medication in their feed during the test.
		<i>A commercial breeder feed or an equivalent that is appropriate for the test species is recommended.</i>

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Parameter	Details	Remarks
		Criteria
Preparation of test diet	<p>To prepare premixes (beginning with the third preparation procedure on 09/28/07), corn oil was combined with approximately half of the needed amount of basal ration and mixed for <i>ca.</i> 5 minutes on a Hobart mixer. A portion of this mixture was blended with the appropriate quantity of test material for at least 60 seconds. The blended diet was then returned to the mixer and mixed for <i>ca.</i> 10 minutes. The remaining half of basal diet was added and the diet mixed for an additional 10 minutes.</p> <p>Premixes were prepared every 2 to 4 weeks, and if not used immediately after mixing, were stored frozen in plastic bags.</p> <p>As needed, the appropriate premix was combined with additional basal ration and limestone and mixed in a Patterson-Kelly Twin Shell Blender for approximately 20 minutes.</p>	<p>To improve homogeneity, the mixing procedure was changed during Week 3.</p> <p><i>A premixed diet containing the test substance should be mechanically mixed with basal diet. If an evaporative vehicle is used, it should be completely evaporated prior to feeding.</i></p>
Indicate whether stability and homogeneity of test material in diet determined (Yes/No)	Yes	
Were concentrations in diet verified by chemical analysis?	Yes	

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Parameter	Details	Remarks
		Criteria
<u>Test conditions (pre-laying)</u> temperature: relative humidity: photoperiod:	$20.6 \pm 2.2^{\circ}\text{C}$ $46 \pm 16\%$ ≤ 8 hr light/day up through Week 9; 17 hr light/day thereafter.	Temperature and humidity were for the adult room during the entire study. The air handling system provided up to 15 room air volumes every hour. Light intensity was approximately 405 lux (ca. 38 ft. candles). <i>Recommended temperature: about 21°C (70°F)</i> <i>Recommended relative humidity: about 55%</i> <i>Recommended lighting</i> <i>First 8 weeks: 7 h per day.</i> <i>Thereafter: 16-17 h per day.</i> <i>At least 6 foot-candles are recommended at bird level.</i>
Egg Collection and Incubation		
<u>Egg collection and storage</u> collection interval: storage temperature: storage humidity:	Daily $14.6 \pm 0.1^{\circ}\text{C}$ $70 \pm 6\%$	<i>Eggs should be collected daily; recommended egg storage temperature is approximately 16°C (61°F); recommended humidity is approximately 65%. Recommended collection interval: daily</i>
Were eggs candled for cracks prior to setting for incubation?	Yes	<i>Eggs should be candled on day 0</i>
Were eggs set weekly?	Yes	Prior to setting, all eggs to be incubated were fumigated with formaldehyde gas in an airtight cabinet for ca. 2 hours to reduce the possibility of pathogen contamination.
When candling was done for fertility?	Eggs were candled again on Days 11 or 12 (embryo viability) and 21 (embryo survival).	<i>Quail: approx. day 11</i> <i>Ducks: approx. day 14</i>
When the eggs were transferred to the hatcher?	Day 21	<i>Bobwhite: usually day 21</i> <i>Mallard: usually day 23</i>

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Parameter	Details	Remarks
		Criteria
<u>Hatching conditions</u> temperature: humidity: photoperiod:	37.2 ± 0.0°C Ca. 77% 16 hours light/8 hours dark (hatchlings)	Recommended temperature is 39°C (102°F) Recommended humidity is 70%
Day the hatched eggs were removed and counted	Days 25 or 26	Eggs for bobwhite should be removed on day 24; for mallard on day 27
Were egg shells washed and dried for at least 48 hrs before measuring?	Yes	
<u>Egg shell thickness</u> no. of eggs used: intervals: mode of measurement:	One egg was collected (when available) from each odd numbered cage during odd numbered weeks and from each even numbered cage during the even numbered weeks. Once weekly throughout the egg laying period. Five points around the equatorial circumference were measured to the nearest 0.002 mm.	Newly hatched eggs should be collected at least once every two weeks. Thickness of the shell plus membrane should be measured to the nearest 0.01 mm with 3 - 4 measurements per shell.
Reference chemical, if used	None used	

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2. Observations:

Table 3: Observations.

Parameter	Details	Remarks
Parameters measured		
<u>Parental</u> (mortality, body weight, mean feed consumption)	- mortality - body weight - food consumption - signs of toxicity - necropsy	All adult birds were subjected to gross necropsy.
<u>Egg collection and subsequent development</u> (no. of eggs laid, no. of eggs cracked, shell thickness, no. of eggs set, no. of viable embryos, no. of live 3 week embryos, no. hatched, no. of 14-day survivors, average weight of 14-d old survivors, mortality, gross pathology, others)	- eggs laid - eggs cracked - egg shell thickness - eggs set - viable embryos - live 3-week embryos - number of hatchlings - hatchling body weight - number of 14-day-old survivors - 14-day-old survivor body weight - signs of toxicity of hatchlings	<i>Recommended endpoints measured include:</i> <ul style="list-style-type: none"> • Eggs laid/pen • Eggs cracked/pen • Eggs set/pen • Viable embryos/pen • Live 3-week embryos/pen • Normal hatchlings/pen • 14-day-old survivors/pen • 14-day-old survivors/pen • Weights of 14-day-old survivors (mean per pen) • Egg shell thickness • Food consumption (mean per pen) • Initial and final body weight (mean per pen)
Indicate if the test material was regurgitated	No indications of dietary regurgitation.	
Observation intervals (for various parameters)	Parental and hatchling mortality and parental signs of toxicity were recorded once daily. Parental body weights were recorded at weeks 0 (test initiation), 2, 4, 6, 8, 10, and 22 (adult termination). Parental food consumption was measured weekly throughout the test.	<i>Body weights and food consumption should be measured at least biweekly</i>
Were raw data included?	Yes	

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II. RESULTS AND DISCUSSION:

A. MORTALITY:

No treatment-related mortalities occurred during the study. However, seven incidental mortalities occurred: one in the control group, two in the 160 mg ai/kg diet group, three in the 400 mg ai/kg diet group, and one in the 1000 mg ai/kg diet group.

The single control mortality was a female found dead during Week 19, without having exhibited any prior clinical signs. Necropsy indicated a neck fracture, with associated feather loss and bruising on the back of the head, and a subcutaneous hematoma at the base of the skull and upper cervical vertebra. Necropsy of the pen-mate was unremarkable.

The first mortality at the 160 mg ai/kg diet level was a male found dead during Week 18, without having exhibited any prior clinical signs. Necropsy indicated feather loss and bruising on the top of the skull, and a subcutaneous hematoma at the base of the skull with cranial bleeding. Necropsy of the pen-mate was unremarkable. The second mortality at this level was another male that was found dead during Week 22; foot lesions (that were subsequently bandaged) were noted during Week 17. Necropsy indicated lesions on the right foot, a friable liver, pale kidneys, and light in color and small (*ca.* 1.5 cm) testes. Necropsy of the pen-mate (the follow day at study termination) was unremarkable.

The first mortality at the 400 mg ai/kg diet level was a male that was euthanized during Week 2; loss of righting reflex was noted prior to euthanasia. Necropsy of this animal indicated lesions on the wings, loose blood in the lower trachea, a small spleen, pale kidneys, an empty crop, and bile-stained gizzard contents. Necropsy of the pen-mate was unremarkable. The second mortality at this level was a female that was found dead during Week 15; weakness and head and neck lesions were observed prior to death. Necropsy of this bird indicated extensive head and neck lesions with cranium exposure, small lacerations on the neck muscles, pale kidneys, egg yolk remnants in the abdominal cavity, and pasty cecal contents. Necropsy of the pen-mate revealed areas of hyperemia in the small intestines, but was otherwise unremarkable. The third mortality at the 400 mg ai/kg diet level was a female that was found dead during Week 19; thinness, a ruffled appearance, and lesions on both wings were observed prior to death. Necropsy indicated emaciation with a loss of muscle mass and prominent keel, little coronary fat, no abdominal fat, and lesions on the leading edge of both wings extending from shoulder to wrist with exposed tendons on the left wing and necrotic margins on both wings. In addition, pale lungs, a pale spleen, pale kidneys, and a regressed ovary were observed. Necropsy of the pen-mate revealed areas of hyperemia in the small intestines, but was otherwise unremarkable.

The single mortality at the 1000 mg ai/kg diet level was a female that was found dead during Week 19, without having exhibited any prior clinical signs. Necropsy indicated a pale spleen, and a mid-cervical vertebra fracture, with associated feather loss, bruising on the top and back of the head, and a subcutaneous hematoma at the base of the skull. Necropsy of the pen-mate indicated areas of hyperemia in the large intestines, but was otherwise unremarkable.

No other mortalities occurred during the study. Due to the timing of the mortalities, the lack of a concentration response, and the nature of lesions observed at necropsy, none of the deaths were considered to be treatment-related. The NOAEC was 1000 mg ai/kg diet.

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Table 4: Effect of DPX-MAT28 Technical (Aminocyclopyrachlor) on Mortality of Northern Bobwhite Quail.

Treatment (mg ai/kg diet) Mean-measured (and Nominal) Concentrations	Observation Period					
	Week 7		Week 15		Week 22	
	No. Dead		No. Dead		No. Dead	
	Male	Female	Male	Female	Male	Female
Control	0	0	0	0	1	0
159 (160)	0	0	0	0	2	0
382 (400)	1	0	1	1	1	2
994 (1000)	0	0	0	0	0	1

B. REPRODUCTIVE AND OTHER ENDPOINTS:

Abnormal Effects/Behavior: No overt signs of toxicity were observed at any treatment level. Incidental clinical observations that are normally associated with injuries (including those from pen-mate aggression) and/or pen-wear included feather loss; foot, wing, neck and head lesions; abscesses; and bruising and swelling. Lameness, ocular injury, thinness, ruffled appearance, lethargy, unilateral wing droop, and ventral head curl were also observed, but were typically associated with the incidental injuries.

One female from the 400 mg ai/kg diet level and one male from the 1000 mg ai/kg diet level were noted as thin, ruffled in appearance, congested, and coughing during Weeks 2 to 6. Furthermore, one female from the 160 mg ai/kg diet level suffered foot and hock lesions (first noted during Week 3) that healed, but restricted leg movement.

Aside from the incidental findings, all birds appeared normal throughout the study. The NOAEC for clinical signs of toxicity was 1000 mg ai/kg diet.

Food Consumption: No apparent treatment-related effects on feed consumption were evident at any treatment level, with no statistically-significant differences from the control observed at any interval for the 400 or 1000 mg ai/kg diet levels. At the 160 mg ai/kg diet level, statistically-significant ($p < 0.05$) increases compared to the control were indicated during Weeks 6 (17 versus 15 g/bird/day for the control), and 12 (22 versus 20 g/bird/day). Since the differences were slight, not concentration-responsive, and not consistent over time, they were not considered to be related to treatment. Overall food consumption averaged 20, 21, 21, and 21 g/bird/day for the control, 160, 400, and 1000 mg ai/kg diet levels, respectively, and the corresponding estimated daily dietary doses were 0, 16.1, 40.0, and 100.9 mg ai/kg day. The NOAEC for feed consumption was 1000 mg ai/kg diet.

Body Weight: No apparent treatment-related effects on body weight were evident at any treatment level, with no statistically-significant differences from the control observed at any interval for any treatment level. The NOAEC for adult body weight was 1000 mg ai/kg diet.

Necropsy: There were no macroscopic findings at necropsy that were considered related to treatment.

Reproductive Effects: No treatment-related effects were evident at any treatment level, with no statistically-significant differences from the control observed for any reproductive or offspring parameter at the 160 or 1000 mg ai/kg diet levels. At the 400 mg ai/kg diet level, there was a slight statistically-significant ($p < 0.01$) reduction in the

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number of 14-day old survivors as a percentage of hatchlings (89 versus 98% for controls). The difference observed, however, was not concentration responsive and was attributed by the study authors to low offspring survival that was observed in three pens. No other statistically-significant differences from the control were indicated at the 400 mg ai/kg diet level for any reproductive or offspring parameter. The NOAEC for all reproductive and offspring endpoints was 1000 mg ai/kg diet.

Table 5: Reproductive and Other Parameters (nominal concentrations; study author-reported)*

Parameter	Control	160 mg/kg	400 mg/kg	1000 mg/kg	NOAEC/ LOAEC
Eggs laid/pen	49	49	53	51	N/A
Eggs laid/hen/day	0.54	0.53	0.58	0.56	N/A
Eggs laid/maximum laid (%)	68	67	73	71	1000 mg/kg >1000 mg/kg
Eggs cracked	33	45	9	16	N/A
Eggs cracked/eggs laid (%)	4	7	1	2	1000 mg/kg >1000 mg/kg
Eggs set	608	596	611	680	N/A
Shell thickness (mm \pm SD)	0.225 \pm 0.019	0.230 \pm 0.024	0.233 \pm 0.011	0.225 \pm 0.013	1000 mg/kg >1000 mg/kg
Viable embryos	512	516	538	626	N/A
Viable embryos/eggs set (%)	79	83	89	93	1000 mg/kg >1000 mg/kg
Live 3-week embryos	510	511	531	625	N/A
Live 3-week embryos/viable embryos (%)	100	97	99	100	1000 mg/kg >1000 mg/kg
No. of hatchlings	490	485	505	603	N/A
No. hatchlings/live 3-week embryos (%)	96	94	94	97	1000 mg/kg >1000 mg/kg
No. of hatchlings/eggs set (%)	76	76	84	90	1000 mg/kg >1000 mg/kg
Hatchling weight (g \pm SD)	6 \pm 0	6 \pm 0	6 \pm 1	6 \pm 0	1000 mg/kg >1000 mg/kg
14-day old survivors	475	461	456	585	N/A
14-day old survivors weight (g \pm SD)	30 \pm 2	30 \pm 2	28 \pm 4	31 \pm 2	1000 mg/kg >1000 mg/kg
14-day old	98	95	89**	97	1000 mg/kg

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Parameter	Control	160 mg/kg	400 mg/kg	1000 mg/kg	NOAEC/ LOAEC
survivors/hatchlings (%)					>1000 mg/kg
Mean food consumption (g/bird/day)	20	21	21	21	1000 mg/kg >1000 mg/kg
Weight (g) of parent females at test initiation:	197	202	200	198	1000 mg/kg
at onset of egg laying:	202	210	206	207	>1000 mg/kg
at test termination:	237	245	241	236	
Weight (g) of parent males at test initiation:	198	201	199	197	1000 mg/kg
at onset of egg laying:	202	204	206	203	>1000 mg/kg
at test termination:	206	213	215	212	
Gross pathology	No treatment-related abnormalities observed.				1000 mg/kg >1000 mg/kg

*The reviewer notes discrepancies in the study author's calculations.

N/A = Not statistically-analyzed.

** Significantly different from the control at $p < 0.01$.

C. REPORTED STATISTICS:

The following variables were statistically analyzed: adult body weight, adult feed consumption, eggs laid of maximum laid, eggs cracked of eggs laid, viable embryos of eggs set, live 3-week embryos of viable embryos, hatchlings of 3-week embryos, 14-day old survivors of hatchlings, hatchlings of eggs set, 14-day old survivors of eggs set, hatchlings of maximum set, 14-day old survivors of maximum set, egg shell thickness, and offspring body weight (0 and 14 days).

Each of the treatment groups was compared to the control group using an analysis of variance (ANOVA) followed by Dunnett's Multiple Comparison Procedure. Sample units were the individual pens within each experimental group, except adult body weights, where the sample unit was the individual bird. Percentage data were arcsine square root transformed prior to analysis. Nominal concentrations were used for all estimations.

D. VERIFICATION OF STATISTICAL RESULTS:

Statistical Method: Analysis was conducted using "chicks.sas" (Ver. 3; March 2002), a SAS program provided by EFED/OPP/USEPA. Data for all endpoints were examined graphically using box plots to determine if they exhibited a dose-dependent response, which was ultimately used to select the multiple comparison test to detect LOAEC and NOAEC. Data for each endpoint were tested to determine if their distributions were normal and if their variances were homogeneous using Shapiro-Wilk's and Levene's tests, respectively. Data that satisfied these assumptions were subjected to Dunnett's and William's tests and data that did not satisfy these assumptions were subjected to the non-parametric MannWhitney-U (with a Bonferroni adjustment) and Jonckheere's tests. Data for dead birds were excluded from the analyses. See Appendix I for output of reviewer's statistical verification and graphs for affected endpoints to support any reviewer-generated conclusions that may differ from those reported in the study.

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NOAEC: 944 mg ai/kg
 LOAEC: >944 mg ai/kg
 Most Sensitive Endpoint(s): None

Table 6: Reproductive and Other Parameters (mean-measured concentrations; reviewer-reported).

Parameter	Control	159 mg ai/kg	382 mg ai/kg	994 mg ai/kg	NOAEC/ LOAEC
Eggs laid/pen	49.1	48.5	52.6	51.1	994 mg ai/kg >994 mg ai/kg
Eggs cracked/pen	2.2	3.0	0.7	1.1	994 mg ai/kg >994 mg ai/kg
Eggs not cracked/eggs laid (%)	96.1	93.0	98.8	97.9	994 mg ai/kg >994 mg ai/kg
Eggs set/pen	40.5	39.7	47.0	45.3	994 mg ai/kg >994 mg ai/kg
Shell thickness	0.22	0.23	0.23	0.23	994 mg ai/kg >994 mg ai/kg
Eggs set/eggs laid (%)	81.3	79.4	88.8	88.6	994 mg ai/kg >994 mg ai/kg
Viable embryos/pen	34.1	34.4	41.4	41.7	994 mg ai/kg >994 mg ai/kg
Viable embryos/eggs set (%)	79.1	83.0	89.2	93.0	994 mg ai/kg >994 mg ai/kg
Live embryos/pen	34.0	34.1	40.8	41.7	994 mg ai/kg >994 mg ai/kg
Live embryos/viable embryos (%)	99.7	97.2	98.6	99.8	994 mg ai/kg >994 mg ai/kg
No. of hatchlings/pen	32.7	32.3	38.8	40.2	994 mg ai/kg >994 mg ai/kg
No. of hatchlings/eggs laid (%)	63.2	63.7	74.4	79.6	994 mg ai/kg >994 mg ai/kg
No. of hatchlings/eggs set (%)	75.5	76.4	83.5	89.8	994 mg ai/kg >994 mg ai/kg
No. of hatchlings/live embryos (%)	95.7	94.2	94.3	96.6	994 mg ai/kg >994 mg ai/kg
Hatchling survival/pen	31.7	30.7	35.1	39.0	994 mg ai/kg >994 mg ai/kg

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Hatchling survival/eggs set (%)	73.6	71.8	73.5	87.3	994 mg ai/kg >994 mg ai/kg
Hatchling survival/no. of hatchlings (%)	97.5	95.0	88.7*	97.0	994 mg ai/kg >994 mg ai/kg
Hatchling weight (g)	5.9	5.9	5.8	6.2	994 mg ai/kg >994 mg ai/kg
Survivor weight (g)	29.9	30.5	28.2	31.0	994 mg ai/kg >994 mg ai/kg
Mean food consumption (g/bird/day)	20.0	20.8	20.6	20.9	994 mg ai/kg >994 mg ai/kg
Male weight gain (g)	8.7	10.6	15.2	13.5	994 mg ai/kg >994 mg ai/kg
Female weight gain (g)	40.3	43.1	41.1	39.0	994 mg ai/kg >994 mg ai/kg

* Statistically different from the control at $p < 0.05$; however, this significant effect was not considered to be an adverse effect of treatment by the reviewer or the study authors.

E. STUDY DEFICIENCIES:

There were no study deficiencies.

F. REVIEWER'S COMMENTS:

Results of the reviewer's statistical verification and conclusions were identical to the study authors'; there were no significant treatment-related effects in this study. Mean-measured concentrations are reported in the Executive Summary and Conclusions sections of the DER. Both the reviewer and the study authors detected a significant reduction ($p < 0.05$, 9%) in the proportion of 14-day survivors of number hatched at the 382 mg ai/kg treatment level.

The study authors dismissed this effect, attributing it to low survival in three pens at this level and noting that it was not a dose-dependent response; the reviewer could not confirm this claim of lower survival of a few replicate pens. However, the reviewer also dismissed the effect as treatment-related and based it on the rationale that both absolute parameters (number of hatchlings and survivors) experienced increases at the 382 mg ai/kg level (relative to the control). Furthermore, the increase in the number of hatchlings (19%, the denominator) exceeded that of the number of survivors (11%, the numerator), thereby supporting evidence for a slight, but significant reduction in the relative ratio of these endpoints, making the effect a mathematical artifact rather than a biologically-significant effect.

All validity requirements were met. Specifically, controls produced an average of 32, 14-day old survivors per hen during the 11-week production phase (minimum of 12 chicks per pen during a 10-week production phase), the egg shell thickness of control eggs was 0.225 mm (minimum of 0.19 mm for bobwhite), and control mortality was 3.1% (no more than 10% acceptable in controls).

It was reported that homogeneity was assessed in treated feed prepared at all treatment levels on Day 0 of Week 1, and that additional samples were collected on Day 0 of Week 3 and Day 2 of Week 3 when the mixing procedure was changed to facilitate better homogeneity of the test substance in the diet. However, only results from Day 2 of Week 3 were reported (in Table 4 of Appendix XIV in the study report).

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Frozen storage stability data were not provided, and premixes of treated feed were prepared at 2- to 4-week intervals and stored frozen until needed. Despite this, it was evident from the concentration verification analyses that DPX-MAT28 Technical (aminocyclopyrachlor) was stable in the treated feed, and failure to provide frozen storage stability data is not considered to have any effect on the integrity of the study.

A minor discrepancy was noted: it was reported (in Section 5.6 – Diet Sampling and Analysis) that to assess stability, samples were collected from the feeders on Day 7 of Week 1 and Day 2 of Week 4; however, in the analytical report (Table 6 of Appendix XIV), results were provided for Days 2 and 9 of Week 3.

Treated feed samples were extracted with methanol:water (80:20, v:v) by sonicating for 15 minutes, then shaking on a table-top shaker at *ca.* 250 rpm for *ca.* 60 minutes. An aliquot of the extract was centrifuged, diluted with methanol:water, and analyzed for aminocyclopyrachlor using HPLC with UV (240 nm) detection. The LOQ for the procedure was 25 mg ai/kg diet. The LOD was set at the lowest analytical standard concentration, 0.500 mg ai/L (15 ng ai on-column based upon a 30-μL injection).

Untreated feed was fortified at 50 or 1500 mg ai/kg diet and analyzed concurrently with the test samples. Recoveries ranged from 86 to 107% for all samples. Sample concentrations were not corrected for mean procedural recoveries.

The experimental dates were September 12, 2007 to March 24, 2008.

G. CONCLUSIONS:

The scientific soundness of this study is questionable, and the study is classified as invalid. Because seven incidental mortalities were observed (all of which showed external signs of injury), small cage size used in this study may have affected reproductive endpoints throughout all treatment levels, including the controls.

NOAEC: N/A

LOAEC: N/A

Endpoint(s) Affected: N/A

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III. REFERENCES:

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APPENDIX I. OUTPUT OF REVIEWER'S STATISTICAL VERIFICATION:

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

PRINTOUT OF RAW DATA

Obs	TRT	EL	EC	ENC	EL	ES	ES	EL	VE	VE	ES	LE	LE	VE	NH	NH	EL	NH	ES
1	Ctrl	34	2	94.12	29	85.29	28	96.55	28	100.00	27	79.41	93.10						
2	Ctrl	49	0	100.00	44	89.80	38	86.36	38	100.00	37	75.51	84.09						
3	Ctrl	36	0	100.00	32	88.89	32	100.00	32	100.00	32	88.89	100.00						
4	Ctrl	63	0	100.00	58	92.06	57	98.28	57	100.00	56	88.89	96.55						
5	Ctrl	62	0	100.00	58	93.55	54	93.10	54	100.00	53	85.48	91.38						
6	Ctrl	57	2	96.49	50	87.72	35	70.00	34	97.14	34	59.65	68.00						
7	Ctrl	47	0	100.00	42	89.36	26	61.90	26	100.00	25	53.19	59.52						
8	Ctrl	30	1	96.67	25	83.33	25	100.00	25	100.00	25	83.33	100.00						
9	Ctrl	65	1	98.46	59	90.77	55	93.22	55	100.00	52	80.00	88.14						
10	Ctrl	60	1	98.33	51	85.00	47	92.16	47	100.00	45	75.00	88.24						
11	Ctrl	.	.	.	.	.	.	.	.	.	.	.	.
12	Ctrl	65	22	66.15	28	43.08	22	78.57	22	100.00	16	24.62	57.14						
13	Ctrl	19	0	100.00	16	84.21	0	0.00	0	.	0	0.00	0.00						
14	Ctrl	57	0	100.00	52	91.23	52	100.00	51	98.08	49	85.96	94.23						
15	Ctrl	29	1	96.55	8	27.59	4	50.00	4	100.00	4	13.79	50.00						
16	Ctrl	64	3	95.31	56	87.50	37	66.07	37	100.00	35	54.69	62.50						
17	Dose1	68	1	98.53	61	89.71	57	93.44	56	98.25	54	79.41	88.52						
18	Dose1	69	0	100.00	64	92.75	57	89.06	56	98.25	54	78.26	84.38						
19	Dose1	66	4	93.94	57	86.36	46	80.70	46	100.00	44	66.67	77.19						
20	Dose1	18	0	100.00	15	83.33	15	100.00	15	100.00	15	83.33	100.00						
21	Dose1	53	1	98.11	48	90.57	47	97.92	47	100.00	45	84.91	93.75						
22	Dose1	42	13	69.05	15	35.71	14	93.33	14	100.00	8	19.05	53.33						
23	Dose1	52	2	96.15	46	88.46	45	97.83	45	100.00	45	86.54	97.83						
24	Dose1	57	6	89.47	45	78.95	39	86.67	38	97.44	36	63.16	80.00						
25	Dose1	61	1	98.36	54	88.52	48	88.89	48	100.00	46	75.41	85.19						
26	Dose1	19	0	100.00	16	84.21	16	100.00	16	100.00	16	84.21	100.00						
27	Dose1	62	0	100.00	57	91.94	44	77.19	44	100.00	37	59.68	64.91						
28	Dose1	48	0	100.00	43	89.58	35	81.40	35	100.00	34	70.83	79.07						
29	Dose1	34	16	52.94	7	20.59	3	42.86	2	66.67	2	5.88	28.57						
30	Dose1	24	0	100.00	20	83.33	4	20.00	4	100.00	4	16.67	20.00						
31	Dose1	.	.	.	.	.	.	.	.	.	.	.	.
32	Dose1	55	1	98.18	48	87.27	46	95.83	45	97.83	45	81.82	93.75						
33	Dose2	70	0	100.00	65	92.86	59	90.77	59	100.00	59	84.29	90.77						
34	Dose2	50	0	100.00	45	90.00	45	100.00	45	100.00	43	86.00	95.56						
35	Dose2	34	0	100.00	31	91.18	30	96.77	29	96.67	29	85.29	93.55						
36	Dose2	51	0	100.00	46	90.20	45	97.83	44	97.78	42	82.35	91.30						
37	Dose2	11	0	100.00	9	81.82	9	100.00	9	100.00	9	81.82	100.00						
38	Dose2	58	0	100.00	53	91.38	53	100.00	53	100.00	53	91.38	100.00						
39	Dose2	60	2	96.67	53	88.33	25	47.17	25	100.00	23	38.33	43.40						
40	Dose2	63	2	96.83	55	87.30	43	78.18	43	100.00	42	66.67	76.36						
41	Dose2	62	0	100.00	56	90.32	53	94.64	53	100.00	52	83.87	92.86						
42	Dose2	54	1	98.15	48	88.89	45	93.75	45	100.00	45	83.33	93.75						
43	Dose2	.	.	.	.	.	.	.	.	.	.	.	.
44	Dose2	.	.	.	.	.	.	.	.	.	.	.	.
45	Dose2	63	1	98.41	57	90.48	51	89.47	49	96.08	47	74.60	82.46						
46	Dose2	48	0	100.00	41	85.42	34	82.93	32	94.12	17	35.42	41.46						
47	Dose2	60	3	95.00	52	86.67	46	88.46	45	97.83	44	73.33	84.62						
48	Dose2	.	.	.	.	.	.	.	.	.	.	.	.
49	Dose3	36	0	100.00	32	88.89	32	100.00	32	100.00	31	86.11	96.88						
50	Dose3	72	2	97.22	64	88.89	46	71.88	46	100.00	40	55.56	62.50						
51	Dose3	0	0	.	0	.	0	.	0	.	0	.	.						
52	Dose3	58	0	100.00	52	89.66	47	90.38	46	97.87	46	79.31	88.46						
53	Dose3	42	0	100.00	39	92.86	39	100.00	39	100.00	38	90.48	97.44						
54	Dose3	52	0	100.00	47	90.38	46	97.87	46	100.00	44	84.62	93.62						
55	Dose3	48	0	100.00	44	91.67	42	95.45	42	100.00	40	83.33	90.91						
56	Dose3	39	4	89.74	30	76.92	30	100.00	30	100.00	30	76.92	100.00						
57	Dose3	64	1	98.44	58	90.63	53	91.38	53	100.00	53	82.81	91.38						

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58	Dose3	65	3	95.38	56	86.15	50	89.29	50	100.00	50	76.92	89.29
59	Dose3
60	Dose3	61	0	100.00	56	91.80	56	100.00	56	100.00	55	90.16	98.21
61	Dose3	64	1	98.44	57	89.06	49	85.96	49	100.00	49	76.56	85.96
62	Dose3	65	4	93.85	54	83.08	53	98.15	53	100.00	46	70.77	85.19
63	Dose3	50	1	98.00	45	90.00	37	82.22	37	100.00	35	70.00	77.78
64	Dose3	51	0	100.00	46	90.20	46	100.00	46	100.00	46	90.20	100.00

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

PRINTOUT OF RAW DATA (continued)

Obs	TRT	NH	LE	HS	HS_ES	HS_NH	THICK	HATWT	SURVWT	FOOD	WTGAINM	WTGAINF
1	Ctrl	96.43	27	93.10	100.00	0.23	6	28	20	12	42	
2	Ctrl	97.37	34	77.27	91.89	0.24	6	28	19	17	35	
3	Ctrl	100.00	32	100.00	100.00	0.24	6	33	20	-2	40	
4	Ctrl	98.25	53	91.38	94.64	0.25	6	32	21	20	40	
5	Ctrl	98.15	53	91.38	100.00	0.21	6	30	22	12	57	
6	Ctrl	100.00	34	68.00	100.00	0.22	6	28	18	11	41	
7	Ctrl	96.15	24	57.14	96.00	0.23	5	27	20	3	36	
8	Ctrl	100.00	25	100.00	100.00	0.21	6	30	19	0	26	
9	Ctrl	94.55	49	83.05	94.23	0.24	6	31	20	1	50	
10	Ctrl	95.74	43	84.31	95.56	0.23	6	32	19	9	49	
11	Ctrl	.	.	.	.	.	.	.	.	.	.
12	Ctrl	72.73	16	57.14	100.00	0.19	6	26	19	12	42	
13	Ctrl	.	0	0.00	.	0.26	.	.	18	-2	15	
14	Ctrl	96.08	48	92.31	97.96	0.23	6	29	22	16	47	
15	Ctrl	100.00	4	50.00	100.00	0.20	6	30	18	1	35	
16	Ctrl	94.59	33	58.93	94.29	0.21	6	34	25	21	50	
17	Dose1	96.43	53	86.89	98.15	0.26	6	29	21	14	49	
18	Dose1	96.43	51	79.69	94.44	0.22	6	30	22	4	50	
19	Dose1	95.65	43	75.44	97.73	0.22	6	33	21	16	43	
20	Dose1	100.00	15	100.00	100.00	0.23	7	34	19	15	45	
21	Dose1	95.74	44	91.67	97.78	0.23	6	30	19	8	56	
22	Dose1	57.14	8	53.33	100.00	0.20	6	32	19	11	38	
23	Dose1	100.00	41	89.13	91.11	0.23	6	30	21	0	53	
24	Dose1	94.74	36	80.00	100.00	0.20	6	32	21	5	32	
25	Dose1	95.83	44	81.48	95.65	0.22	6	33	22	.	48	
26	Dose1	100.00	11	68.75	68.75	0.25	5	30	22	4	28	
27	Dose1	84.09	37	64.91	100.00	0.25	6	31	21	9	53	
28	Dose1	97.14	30	69.77	88.24	0.23	6	29	20	20	24	
29	Dose1	100.00	2	28.57	100.00	0.19	5	24	21	2	28	
30	Dose1	100.00	4	20.00	100.00	0.27	6	30	22	8	33	
31	Dose1	.	.	.	.	.	.	.	.	.	.
32	Dose1	100.00	42	87.50	93.33	0.25	6	31	21	32	66	
33	Dose2	100.00	55	84.62	93.22	0.22	6	28	22	14	63	
34	Dose2	95.56	42	93.33	97.67	0.25	6	30	18	3	46	
35	Dose2	100.00	21	67.74	72.41	0.25	5	25	17	6	-5	
36	Dose2	95.45	36	78.26	85.71	0.21	6	29	20	17	29	
37	Dose2	100.00	6	66.67	66.67	0.23	5	21	20	24	22	
38	Dose2	100.00	51	96.23	96.23	0.23	6	28	22	29	55	
39	Dose2	92.00	23	43.40	100.00	0.23	6	30	21	20	46	
40	Dose2	97.67	31	56.36	73.81	0.23	5	24	20	3	56	
41	Dose2	98.11	48	85.71	92.31	0.22	7	35	22	18	75	
42	Dose2	100.00	42	87.50	93.33	0.24	6	32	22	18	32	
43	Dose2	.	.	.	.	.	.	.	.	.	.
44	Dose2	.	.	.	.	.	.	.	.	.	.
45	Dose2	95.92	41	71.93	87.23	0.24	5	26	23	23	44	
46	Dose2	53.13	16	39.02	94.12	0.23	7	26	21	13	47	
47	Dose2	97.78	44	84.62	100.00	0.25	6	32	20	9	24	
48	Dose2	.	.	.	.	.	.	.	.	.	.
49	Dose3	96.88	31	96.88	100.00	0.22	6	33	22	7	53	
50	Dose3	86.96	35	54.69	87.50	0.24	7	31	22	5	47	
51	Dose3	.	0	19	-2	-13	

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52	Dose3	100.00	46	88.46	100.00	0.21	6	29	21	5	48
53	Dose3	97.44	37	94.87	97.37	0.23	6	28	23	1	-19
54	Dose3	95.65	42	89.36	95.45	0.23	6	30	19	12	46
55	Dose3	95.24	40	90.91	100.00	0.23	6	30	18	23	52
56	Dose3	100.00	29	96.67	96.67	0.23	6	32	19	12	11
57	Dose3	100.00	52	89.66	98.11	0.22	6	31	24	14	48
58	Dose3	100.00	50	89.29	100.00	0.21	6	31	22	22	49
59	Dose3	.	.	.	.	.	.	.	.	.	.
60	Dose3	98.21	52	92.86	94.55	0.22	6	33	20	24	50
61	Dose3	100.00	48	84.21	97.96	0.25	7	29	21	11	68
62	Dose3	86.79	44	81.48	95.65	0.20	7	33	22	28	55
63	Dose3	94.59	34	75.56	97.14	0.23	6	34	21	30	55
64	Dose3	100.00	45	97.83	97.83	0.22	6	30	20	10	35

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE EL (Eggs Laid)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.902	<.001	0.316	0.814	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	49.13	15.61	4.03	31.76	40.49, 57.78
Dose1	15	48.53	17.41	4.50	35.88	38.89, 58.18
Dose2	13	52.62	15.42	4.28	29.32	43.29, 61.94
Dose3	15	51.13	17.69	4.57	34.60	41.34, 60.93

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	57.00	19.00	65.00	.	.
Dose1	53.00	18.00	69.00	98.78	1.22
Dose2	58.00	11.00	70.00	107.09	-7.09
Dose3	52.00	0.00	72.00	104.07	-4.07

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.49	0.921

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	57.00	.	.
Dose1	53.00	1.000	0.467
Dose2	58.00	1.000	0.668
Dose3	52.00	0.787	0.727

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE NEG_EC (Eggs Cracked)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.599	<.001	2.701	0.055	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	2.20	5.56	1.43	252.61	0.00, 5.28
Dose1	15	3.00	5.00	1.29	166.67	0.23, 5.77
Dose2	13	0.69	1.03	0.29	149.00	0.07, 1.32
Dose3	15	1.07	1.49	0.38	139.35	0.24, 1.89

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	1.00	0.00	22.00	.	.
Dose1	1.00	0.00	16.00	136.36	-36.36
Dose2	0.00	0.00	3.00	31.47	68.53
Dose3	0.00	0.00	4.00	48.48	51.52

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.76	0.623

MannWhit(Bon) - testing each trt median signif. greater than control

Jonckheere - test assumes dose-response relationship, testing positive trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	1.00	.	.
Dose1	1.00	1.000	0.292
Dose2	0.00	1.000	0.741
Dose3	0.00	1.000	0.725

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE ENC_EL ((EL-EC)/EL (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.595	<.001	4.037	0.012	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	96.14	8.53	2.20	8.87	91.41, 100.00
Dose1	15	92.98	13.65	3.52	14.68	85.42, 100.00
Dose2	13	98.85	1.71	0.47	1.73	97.82, 99.88
Dose3	14	97.93	3.05	0.82	3.12	96.17, 99.70

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	98.46	66.15	100.00	.	.
Dose1	98.36	52.94	100.00	96.72	3.28
Dose2	100.00	95.00	100.00	102.82	-2.82
Dose3	99.22	89.74	100.00	101.87	-1.87

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.94	0.585

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	98.46	.	.
Dose1	98.36	1.000	0.325
Dose2	100.00	1.000	0.810
Dose3	99.22	1.000	0.765

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE ES (Eggs Set)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.921	0.001	1.613	0.197	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	40.53	16.47	4.25	40.64	31.41, 49.66
Dose1	15	39.73	19.46	5.03	48.98	28.96, 50.51
Dose2	13	47.00	14.17	3.93	30.14	38.44, 55.56
Dose3	15	45.33	15.82	4.09	34.90	36.57, 54.10

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	44.00	8.00	59.00	.	.
Dose1	46.00	7.00	64.00	98.03	1.97
Dose2	52.00	9.00	65.00	115.95	-15.95
Dose3	47.00	0.00	64.00	111.84	-11.84

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.18	0.758

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	44.00	.	.
Dose1	46.00	1.000	0.450
Dose2	52.00	1.000	0.769
Dose3	47.00	1.000	0.802

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE ES_EL (EggsSet/EggsLaid (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.613	<.001	4.240	0.009	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	81.29	19.12	4.94	23.52	70.70, 91.88
Dose1	15	79.42	21.33	5.51	26.85	67.61, 91.23
Dose2	13	88.83	2.95	0.82	3.32	87.05, 90.62
Dose3	14	88.58	4.15	1.11	4.68	86.19, 90.98

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	87.72	27.59	93.55	.	.
Dose1	87.27	20.59	92.75	97.70	2.30
Dose2	90.00	81.82	92.86	109.28	-9.28
Dose3	89.83	76.92	92.86	108.97	-8.97

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.89	0.273

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	87.72	.	.
Dose1	87.27	0.828	0.267
Dose2	90.00	1.000	0.817
Dose3	89.83	1.000	0.936

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE VE (Viable Embryo(d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.929	0.002	1.526	0.218	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	34.13	17.47	4.51	51.19	24.46, 43.81
Dose1	15	34.40	18.71	4.83	54.39	24.04, 44.76
Dose2	13	41.38	13.65	3.79	32.99	33.13, 49.64
Dose3	15	41.73	13.80	3.56	33.06	34.09, 49.37

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	35.00	0.00	57.00	.	.
Dose1	44.00	3.00	57.00	100.78	-0.78
Dose2	45.00	9.00	59.00	121.24	-21.24
Dose3	46.00	0.00	56.00	122.27	-22.27

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.07	0.558

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	35.00	.	.
Dose1	44.00	1.000	0.566
Dose2	45.00	1.000	0.820
Dose3	46.00	1.000	0.919

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE VE_ES (ViableEmbryo/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.784	<.001	2.662	0.057	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	79.08	27.06	6.99	34.22	64.09, 94.07
Dose1	15	83.01	22.53	5.82	27.14	70.53, 95.49
Dose2	13	89.23	14.32	3.97	16.05	80.57, 97.89
Dose3	14	93.04	8.49	2.27	9.12	88.14, 97.94

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	92.16	0.00	100.00	.	.
Dose1	89.06	20.00	100.00	104.97	-4.97
Dose2	93.75	47.17	100.00	112.83	-12.83
Dose3	96.66	71.88	100.00	117.65	-17.65

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.35	0.340

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	92.16	.	.
Dose1	89.06	1.000	0.607
Dose2	93.75	1.000	0.835
Dose3	96.66	1.000	0.966

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE LE (Live Embryo(d21))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.930	0.002	1.473	0.232	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	34.00	17.40	4.49	51.17	24.36, 43.64
Dose1	15	34.07	18.60	4.80	54.61	23.76, 44.37
Dose2	13	40.85	13.67	3.79	33.46	32.59, 49.11
Dose3	15	41.67	13.77	3.56	33.05	34.04, 49.29

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	34.00	0.00	57.00	.	.
Dose1	44.00	2.00	56.00	100.20	-0.20
Dose2	45.00	9.00	59.00	120.14	-20.14
Dose3	46.00	0.00	56.00	122.55	-22.55

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.13	0.545

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	34.00	.	.
Dose1	44.00	1.000	0.550
Dose2	45.00	1.000	0.805
Dose3	46.00	1.000	0.925

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE LE_VE (LiveEmbryo/ViableEmbryo (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.378	<.001	2.877	0.045	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	14	99.66	0.89	0.24	0.89	99.15, 100.00
Dose1	15	97.23	8.51	2.20	8.75	92.52, 100.00
Dose2	13	98.65	1.98	0.55	2.01	97.45, 99.85
Dose3	14	99.85	0.57	0.15	0.57	99.52, 100.00

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	100.00	97.14	100.00	.	.
Dose1	100.00	66.67	100.00	97.56	2.44
Dose2	100.00	94.12	100.00	98.99	1.01
Dose3	100.00	97.87	100.00	100.19	-0.19

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	5.74	0.125

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	100.00	.	.
Dose1	100.00	1.000	0.135
Dose2	100.00	1.000	0.059
Dose3	100.00	1.000	0.594

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE NH (Number Hatched)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.934	0.004	1.328	0.275	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	32.67	17.10	4.41	52.34	23.20, 42.14
Dose1	15	32.33	18.25	4.71	56.45	22.23, 42.44
Dose2	13	38.85	14.90	4.13	38.35	29.84, 47.85
Dose3	15	40.20	13.39	3.46	33.30	32.79, 47.61

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	34.00	0.00	56.00	.	.
Dose1	37.00	2.00	54.00	98.98	1.02
Dose2	43.00	9.00	59.00	118.92	-18.92
Dose3	44.00	0.00	55.00	123.06	-23.06

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.36	0.501

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	34.00	.	.
Dose1	37.00	1.000	0.550
Dose2	43.00	1.000	0.811
Dose3	44.00	1.000	0.926

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE NH_EL (NumberHatched/EggsLaid (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.841	<.001	4.096	0.011	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	63.23	28.89	7.46	45.69	47.23, 79.23
Dose1	15	63.72	27.16	7.01	42.62	48.68, 78.76
Dose2	13	74.36	17.82	4.94	23.96	63.60, 85.13
Dose3	14	79.55	9.63	2.57	12.11	73.99, 85.11

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	75.51	0.00	88.89	.	.
Dose1	75.41	5.88	86.54	100.78	-0.78
Dose2	82.35	35.42	91.38	117.61	-17.61
Dose3	81.06	55.56	90.48	125.82	-25.82

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	3.83	0.281

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	75.51	.	.
Dose1	75.41	1.000	0.426
Dose2	82.35	1.000	0.828
Dose3	81.06	1.000	0.960

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE NH_ES (NumberHatched/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.853	<.001	2.854	0.046	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	75.53	26.89	6.94	35.60	60.64, 90.42
Dose1	15	76.43	24.81	6.41	32.46	62.69, 90.17
Dose2	13	83.54	19.42	5.39	23.25	71.81, 95.28
Dose3	14	89.83	10.13	2.71	11.27	83.98, 95.68

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	88.14	0.00	100.00	.	.
Dose1	84.38	20.00	100.00	101.20	-1.20
Dose2	91.30	41.46	100.00	110.62	-10.62
Dose3	91.14	62.50	100.00	118.94	-18.94

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.99	0.394

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	88.14	.	.
Dose1	84.38	1.000	0.508
Dose2	91.30	1.000	0.752
Dose3	91.14	1.000	0.945

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE NH_LE (NumberHatched/LiveEmbryo (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.560	<.001	0.734	0.537	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	14	95.72	6.91	1.85	7.22	91.73, 99.71
Dose1	15	94.21	11.03	2.85	11.71	88.11, 100.00
Dose2	13	94.28	12.61	3.50	13.37	86.66, 100.00
Dose3	14	96.55	4.55	1.21	4.71	93.93, 99.18

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	96.90	72.73	100.00	.	.
Dose1	96.43	57.14	100.00	98.43	1.57
Dose2	97.78	53.13	100.00	98.50	1.50
Dose3	97.83	86.79	100.00	100.87	-0.87

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	0.14	0.986

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	96.90	.	.
Dose1	96.43	1.000	0.527
Dose2	97.78	1.000	0.584
Dose3	97.83	1.000	0.635

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE HS (Hatching Survival(d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.942	0.008	1.245	0.303	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	31.67	16.38	4.23	51.73	22.59, 40.74
Dose1	15	30.73	17.73	4.58	57.70	20.91, 40.55
Dose2	13	35.08	14.72	4.08	41.96	26.18, 43.97
Dose3	15	39.00	13.07	3.37	33.50	31.76, 46.24

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	33.00	0.00	53.00	.	.
Dose1	37.00	2.00	53.00	97.05	2.95
Dose2	41.00	6.00	55.00	110.77	-10.77
Dose3	42.00	0.00	52.00	123.16	-23.16

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	2.16	0.539

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	33.00	.	.
Dose1	37.00	1.000	0.525
Dose2	41.00	1.000	0.704
Dose3	42.00	1.000	0.918

SUMMARY	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE HS_ES (HatchingSurvival/EggsSet (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.895	<.001	2.424	0.076	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	73.60	26.37	6.81	35.83	59.00, 88.21
Dose1	15	71.81	22.61	5.84	31.48	59.29, 84.33
Dose2	13	73.49	18.25	5.06	24.83	62.46, 84.52
Dose3	14	87.34	11.27	3.01	12.91	80.83, 93.84

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	83.05	0.00	100.00	.	.
Dose1	79.69	20.00	100.00	97.56	2.44
Dose2	78.26	39.02	96.23	99.85	0.15
Dose3	89.51	54.69	97.83	118.66	-18.66

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	6.74	0.081

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	83.05	.	.
Dose1	79.69	0.933	0.302
Dose2	78.26	1.000	0.320
Dose3	89.51	1.000	0.946

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE HS_NH (HatchingSurvival/NumberHatched (%))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.829	<.001	6.242	0.001	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	14	97.47	2.92	0.78	2.99	95.78, 99.15
Dose1	15	95.01	8.14	2.10	8.57	90.50, 99.52
Dose2	13	88.67	11.03	3.06	12.44	82.00, 95.34
Dose3	14	97.02	3.28	0.88	3.38	95.12, 98.91

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	98.98	91.89	100.00	.	.
Dose1	97.78	68.75	100.00	97.48	2.52
Dose2	93.22	66.67	100.00	90.97	9.03
Dose3	97.60	87.50	100.00	99.54	0.46

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	9.15	0.027

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	98.98	.	.
Dose1	97.78	0.813	0.261
Dose2	93.22	0.021	0.004
Dose3	97.60	1.000	0.166

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose1	Dose2
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE THICK (Eggshell thickness)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.992	0.963	2.442	0.074	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	0.22	0.02	0.00	8.62	0.21, 0.24
Dose1	15	0.23	0.02	0.01	10.20	0.22, 0.24
Dose2	13	0.23	0.01	0.00	4.55	0.23, 0.24
Dose3	14	0.23	0.01	0.00	5.80	0.22, 0.23

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	0.23	0.19	0.26	.	.
Dose1	0.23	0.19	0.27	102.58	-2.58
Dose2	0.23	0.21	0.25	104.01	-4.01
Dose3	0.23	0.20	0.25	100.40	-0.40

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	53	0.80	0.501

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Dose1	Dose2	Tukey p-values Dose3	Dose4	Dose5
Ctrl	0.22	.	0.23	.	0.805	0.540	0.999	.	.
Dose1	0.23	0.957	0.23	0.846	.	0.964	0.877	.	.
Dose2	0.23	0.987	0.23	0.867	.	.	0.635	.	.
Dose3	0.23	0.801	0.23	0.694	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE HATWT (Hatchling Weight)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.837	<.001	3.335	0.026	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	14	5.93	0.27	0.07	4.51	5.77, 6.08
Dose1	15	5.93	0.46	0.12	7.71	5.68, 6.19
Dose2	13	5.85	0.69	0.19	11.78	5.43, 6.26
Dose3	14	6.21	0.43	0.11	6.85	5.97, 6.46

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	6.00	5.00	6.00	.	.
Dose1	6.00	5.00	7.00	100.08	-0.08
Dose2	6.00	5.00	7.00	98.61	1.39
Dose3	6.00	6.00	7.00	104.82	-4.82

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	4.56	0.207

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	6.00	.	.
Dose1	6.00	1.000	0.500
Dose2	6.00	1.000	0.299
Dose3	6.00	1.000	0.896

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE SURVWT (Survivor Wt (d14))

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.982	0.543	2.340	0.084	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	14	29.86	2.35	0.63	7.87	28.50, 31.21
Dose1	15	30.53	2.36	0.61	7.72	29.23, 31.84
Dose2	13	28.15	3.78	1.05	13.44	25.87, 30.44
Dose3	14	31.00	1.80	0.48	5.80	29.96, 32.04

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	30.00	26.00	34.00	.	.
Dose1	30.00	24.00	34.00	102.26	-2.26
Dose2	28.00	21.00	35.00	94.30	5.70
Dose3	31.00	28.00	34.00	103.83	-3.83

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	52	2.99	0.039

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Dose1	Dose2	Tukey p-values Dose3	Dose4	Dose5
Ctrl	29.86	.	30.21	.	0.901	0.348	0.664	.	.
Dose1	30.53	0.928	30.21	0.726	.	0.094	0.964	.	.
Dose2	28.15	0.118	29.63	0.518	.	.	0.035	.	.
Dose3	31.00	0.976	29.63	0.533	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE FOOD (Food Consumption)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.973	0.220	1.007	0.397	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	20.00	1.89	0.49	9.45	18.95, 21.05
Dose1	15	20.80	1.08	0.28	5.20	20.20, 21.40
Dose2	13	20.62	1.71	0.47	8.29	19.58, 21.65
Dose3	15	20.87	1.68	0.43	8.07	19.93, 21.80

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	20.00	18.00	25.00	.	.
Dose1	21.00	19.00	22.00	104.00	-4.00
Dose2	21.00	17.00	23.00	103.08	-3.08
Dose3	21.00	18.00	24.00	104.33	-4.33

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	54	0.89	0.450

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Dose1	Dose2	Tukey p-values Dose3	Dose4	Dose5
Ctrl	20.00	.	20.57	.	0.533	0.748	0.464	.	.
Dose1	20.80	0.987	20.57	0.898	.	0.990	0.999	.	.
Dose2	20.62	0.966	20.57	0.914	.	.	0.976	.	.
Dose3	20.87	0.991	20.57	0.931	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

ANALYSIS RESULTS FOR VARIABLE WTGAINM (Male wt gain)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01

Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05

Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.976	0.322	0.357	0.784	USE PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	8.73	8.00	2.06	91.55	4.31, 13.16
Dose1	14	10.57	8.45	2.26	79.90	5.69, 15.45
Dose2	13	15.15	8.15	2.26	53.80	10.23, 20.08
Dose3	15	13.47	9.86	2.55	73.24	8.01, 18.93

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	11.00	-2.00	21.00	.	.
Dose1	8.50	0.00	32.00	121.05	-21.05
Dose2	17.00	3.00	29.00	173.52	-73.52
Dose3	12.00	-2.00	30.00	154.20	-54.20

PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Analysis of Variance (ANOVA) - overall F-test

Numerator df	Denominator df	F-stat	P-value
3	53	1.55	0.212

Dunnett - testing each trt mean signif. less than control

Williams - test assumes dose-response relationship, testing negative trend

Tukey - two-sided tests, all possible comparisons, not used for NOEC or LOEC

Level	Mean	Dunnett p-value	Isotonic mean	Williams p-value	Dose1	Dose2	Tukey p-values Dose3	Dose4	Dose5
Ctrl	8.73	.	11.89	.	0.940	0.218	0.447	.	.
Dose1	10.57	0.911	11.89	0.901	.	0.522	0.805	.	.
Dose2	15.15	0.998	11.89	0.920	.	.	0.955	.	.
Dose3	13.47	0.992	11.89	0.936	.	.	.	.	.

SUMMARY

	NOEC	LOEC
Dunnett	Dose3	>highest dose
Williams	Dose3	>highest dose

Data Evaluation Report on the Reproductive Effects of DPX-MAT28 Technical (Aminocyclopyrachlor) on Northern Bobwhite Quail (*Colinus virginianus*)

PMRA Submission Number {.....}

EPA MRID Number 47560121

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121
ANALYSIS RESULTS FOR VARIABLE WTGAINF (Female wt gain)

TESTS OF ASSUMPTIONS FOR PARAMETRIC ANALYSIS

Shapiro-Wilks test for Normality of Residuals -- alpha-level=0.01
Levenes test for homogeneity of variance(absolute residuals) -- alpha-level=0.05
Use parametric analyses if neither test rejected, otherwise non-parametric analyses.

Shapiro-Wilks	Shapiro-Wilks	Levenes	Levenes	Conclusion
Test Stat	P-value	Test Stat	P-value	
0.907	<.001	3.281	0.028	USE NON-PARAMETRIC TESTS

BASIC SUMMARY STATISTICS

Level	N	Mean	StdDev	StdErr	Coef of Var	95% Conf.Interval
Ctrl	15	40.33	10.40	2.68	25.78	34.58, 46.09
Dose1	15	43.07	12.16	3.14	28.23	36.33, 49.80
Dose2	13	41.08	20.71	5.74	50.42	28.56, 53.59
Dose3	15	39.00	25.47	6.58	65.31	24.90, 53.10

Level	Median	Min	Max	%of Control(means)	%Reduction(means)
Ctrl	41.00	15.00	57.00	.	.
Dose1	45.00	24.00	66.00	106.78	-6.78
Dose2	46.00	-5.00	75.00	101.84	-1.84
Dose3	48.00	-19.00	68.00	96.69	3.31

NON-PARAMETRIC ANALYSES - use alpha-level=0.05 for all tests

Kruskal-Wallis test - equality among treatment groups

Degrees of Freedom	TestStat	P-value
3	1.12	0.773

MannWhit(Bon) - testing each trt median signif. less than control

Jonckheere - test assumes dose-response relationship, testing negative trend

Level	Median	MannWhit(Bon adjust)p-value	Jonckheere p-value
Ctrl	41.00	.	.
Dose1	45.00	1.000	0.719
Dose2	46.00	1.000	0.648
Dose3	48.00	1.000	0.813

SUMMARY

	NOEC	LOEC
MannWhit (Bonf adjust)	Dose3	>highest dose
Jonckheere	Dose3	>highest dose

Box Plot:

Bobwhite repro, Aminocyclopyrachlor, MRID 47560121

